Coronavirus Disease (COVID-19)

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Coronavirus Disease (COVID-19): Characteristics in children and considerations for Dentists providing their care.

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ABSTRACT

The emergence of the novel virus Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV2) has caused a global pandemic called Coronavirus Disease (COVID-19) and has become one of the most significant challenges to the healthcare profession. Dental practices are focal points for cross-infection and care must be taken to minimise the risk of infection to, from, or between dental care professionals and patients. The COVID-19 disease epidemiological and clinical characteristics are still being collated but children's symptoms seem to be milder than those that adults experience. It is unknown whether certain groups, for example, children with comorbidities, might be at a higher risk of more severe illness. Emerging data on disease spread in children, affected by COVID-19 has not been presented in detail. The purpose of this article is to report current data on the paediatric population affected with COVID-19 and highlight considerations for dentists providing care for children during this pandemic. All members of the dental team have a professional responsibility to keep themselves informed of current guidance and be vigilant in updating themselves as recommendations are changing so quickly.

Keywords

Coronavirus; COVID-19; Children; Dentistry; Paediatric Dentistry

1. INTRODUCTION

At the beginning of 2020, the novel virus Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV2) appeared, causing the Coronavirus Disease (COVID-19). The emerging virus has resulted in a global pandemic declared a Public Health Emergency of International Concern (PHEIC) by the World Health Organization (WHO) Director-General on the recommendation of the International Health Regulations (2005) Emergency Committee.[1] The case detection rate is changing daily and can be tracked in almost real-time.[2] As of 31st March 2020, 19:50 hours (Central Standard Time), the number of confirmed cases were 857,487 and reported deaths were 42,106 with 169,418 recovered patients.[2] The first case of a dentist being tested positive for COVID-19 was reported on 23rd January 2020 at the Department of Preventive Dentistry in the Wuhan University Dental Hospital. Eventually, the transmission of disease to eight other oral healthcare professionals was identified.[3] The characteristics of epidemiological spread and clinical manifestations of COVID-19 in children have not yet been thoroughly elucidated. This article reports current data on the paediatric population affected with COVID-19, and emphasises the importance of following locally, regionally, and nationally relevant safety measures to protect dental care professionals as well as the child patient, whilst providing clinical care for the obviously affected children and those potential carriers of the infection. We emphasise that, in a rapidly changing pandemic landscape, practitioners must actively, regularly seek and use reputable and reliable sources of information on managing child patients that are appropriate for their own region and circumstances.

2. COVID-19

2.1. Clinical characteristics of COVID-19 in children

The clinical symptoms of COVID-19 are still being documented and collated, although the majority of affected patients exhibit symptoms including a dry cough which is usually accompanied by fever.[4] Difficulty in breathing, fatigue and other less typical symptoms can also occur.[5,6] Signs and symptoms include different stages as asymptomatic, mild, moderate, severe and critical.[7] Children tend to present with similar but milder symptoms to adults. To date, 3,092 paediatric cases have been

reported to have tested positive, and 1,412 children were suspected of having been infected with COVID-19. A survey of 1391 children in China found 171 (12.3%) cases tested positive for SARS-CoV2.[8] An analysis of more than 2000 child patients with suspected or confirmed COVID-19 in Hubei, China, found that over 90% presented as asymptomatic or with mild to moderate symptoms.[9] A summary of paediatric cases reported with COVID-19 is presented in Table 1.[7,9-45] These numbers are likely to be under-representative, as there is not universal testing of the whole population for presence of COVID-19. An overall fatality rate of 1.36% to 15% has been reported across all patients with COVID-19.[46] As of 31st March 2020, seven fatalities have been reported in paediatric population due to COVIID-19. These are; an infant in Chicago,[47] a minor child in New York,[48] a 12-year old boy in Belgium,[49] a 13-year-old boy in England,[50] a 14-year old boy in China,[7] a 16-year old girl in France,[51] and a 17-year old boy in Los Angeles.[52]

2.2. The child patient in the dental setting

Because of the long incubation period (two to 14 days)[6] for everyone, and because children can be aymptomatic or present with mild, non-specific symtpoms, all child patients and parents should be considered as potential carriers of COVID-19 unless proven otherwise. COVID-19 disease can be transmitted through direct and indirect contact, mainly via respiratory droplets and splatter from saliva and blood through contact with mucous membranes and contaminated fomites.[53,54] This leaves dental professionals in potentially high-risk situations. Many dental treatments are aerosol generating procedures (AGPs), which have been associated with the transmission of acute respiratory infections.[55] In addition, dental settings are more likely to have a high number of potentially contaminated surfaces such as dental chairs, their handles, the spittoon and dental instruments after carrying out a treatment which are possible routes of transmission.[3] SARS CoV-2 virus can persist on surfaces for up to 72 hours[56] and all clinic surfaces should be disinfected using chemicals recommended for SARS CoV-2.

Universal precautions should be routinely followed in dental clinics. They are critical for avoiding the transmission of SARS CoV-2 virus to children as well as transmission from infected children to

health care professionals. An infection prevention checklist should be used, including administrative measures, infection prevention education and training, dental health care personnel safety, program evaluation, hand hygiene, personal protective equipment (PPE), respiratory hygiene/cough etiquette, sharps safety, safe injection practices, sterilization and disinfection of patient-care items and devices, environmental infection prevention and control, and dental unit water quality.[57,58]

2.3. Country specific approaches and recommendations

The WHO has described a pandemic as having six different phases.[59] Countries will be in different phases at different times, therefore it is not possible to give universal guidelines so following local updated guidelines is essential. All the above applies to child patients during the acute phase of COVID-19 pandemic, and the treatment choices and planning may vary during the next phases. Countries have put different measures in place for the overall delivery of dental care even during the "Widespread Human Infection" phases of the pandemic leading up to the peaks of infection. These vary from those where dental practices remain open but there are screening activities and additional cross-infection measures. These measures generally seem to fit for countries who managed to contain the disease spread quite quickly as seen in Singapore, for example, where isolation and testing were put in place within a very short space of the infection being suspected as being present in the country.[60] At the other end of the spectrum, some countries have closed all dental practices. Some, such as the UK, have all cases triaged by telephone and attending only for very basic treatment in designated centres. In Brazil, The National Health Surveillance Agency (ANVISA) has recommended that only emergency and urgent dental care should be performed (from March 20th 2020), and all private offices have to stop elective treatments. Dental professionals (primary and secondary care) that work for the National Health Service (SUS) have been allocated to help other health professionals in the fast-track for COVID-19.[61] Between these two examples, there are a myriad of service delivery models.

There are a number of country-specific measures currently in place. For example, in the United States (US), Telephone Health (Telehealth) systems have been introduced, and United States Department of Health and Human Services has relaxed the Health Insurance Portability and Accountability Act

(HIPAA) regulations in order to enable free and transparent Telehealth services to patients during the COVID-19 public health emergency.[62] In Brazil, the Ministry of Health has also implemented regulations for Telehealth services to reduce disease transmission.[63] Even though countries may be limiting dental care to only emergency provision, the recommendations between countries may differ. There are some differences between recently published documents on urgent non-emergency, and emergency dental procedures by the American Dental Association,[64] and the UK Scottish Dental Clinical Effectiveness Practice guidelines.[65] The American Academy of Pediatric Dentistry has also produced an algorithm specific to managing children with emergency dental conditions.[66,67] As yet, it is difficult to give standard recommendations regarding personal protective equipment (PPE). The use of N-95 respirator masks in US, and in Europe, use of Filtering Facepiece Respirator (FFP) masks, are strongly indicated in managing children but this is not a universal recommendation across all countries.[68] The evidence is lacking for mask use in some areas.[69] The recommendations provided by the Center for Disease prevention Center (CDC) or other local guidelines that may supersede these should be strictly followed when placing on and removing personal protective equipment used for treating children infected by COVID-19.[58]

2.4. The role of guidelines and professional judgement

Guidance cannot ever cover all possible circumstances and professional judgement must be exercised to make decisions around whether or not to provide treatment. Treatment should only be provided when local, regional, and national guidelines are adhered to as far as possible and, in the opinion of the dental professional, is safe for child patients, their accompanying carer, and the dental. During this COVID-19 pandemic, universal infection control procedures are of utmost importance with extreme vigilance and championing required by all. Globally, many primary and secondary dental services have been suspended, with many countries providing telephone-based triage systems to identify those patients requiring urgent or emergency intervention.[59,63] Where dental professionals must offer assessment and/or treatment on a face-to-face basis, they should record all precautions that have been put in place to reduce the risk of cross-infection during treatment and evidence comprehensive risk

assessment completion. This includes managing the risk from the treatment itself by carrying out the least invasive treatment possible, and avoiding AGPs.[57,68]

Healthcare guidance is being updated with alarming frequency, and confusion as to how best proceed in a care setting is both evident and widespread. It is of the highest importance that all members of the dental team acknowledge and act upon their professional responsibility to ensure they are absolutely contemporary in their understanding of current guidance. Additionally, dental teams should be familiar with treatment options that minimise, or eliminate AGPs - many of which are founded on contemporary cariology, well documented in the scientific literature, and minimally invasive by their nature. It must also be appreciated that pandemic experience and staging will differ geographically. Once practice restrictions begin to be eased, continued management of dental disease with contemporary dentistry through minimally interventive concepts and other non-AGPs, while viral transmission risk remains high, will be pertinent. These include Atraumatic Restorative Treatment[70], sealing in carious lesions using fissure sealants,[71] silver diamine fluoride,[72] selective caries removal[73] and the Hall Technique.[74] The importance of toothbrushing with fluoridated toothpaste to prevent tooth decay developing should continue to be emphasized during contact with patients and there are opportunities being taken for dentists to carry out telephone and video consultations with parents to promote positive oral health behaviors.

3. CONCLUSIONS

Although reported clinical manifestations of children's COVID-19 are generally less severe than those of adult patients, young children, and particularly infants, remain vulnerable to infection and pose a significant transmission risk. Dental teams must ensure they remain current in their understanding of local, regional and national guidance in a climate of uncertainty and frequent change to optimise safety for dental care providers and patients. Dentists who treat children during this pandemic should enact universal infection control procedures to the highest standard and champion this behaviour through their teams. Opportunities to promote preventive dental behavioiurs should be

taken. Contemporary, minimally invasive procedures that minimise or eliminate aerosol generation should be employed where intervention is indicated throughout the pandemic, and in future as and when practice restrictions ease.

Disclaimer: The views expressed in this editorial represent the views of the authors and not necessarily those of their host institutions. It has not been peer-reviewed and it does not replace the clinical judgement of the professional. All sources included should be checked to ensure they are still current.

Table legend

Table 1. Summary of reported paediatric cases on COVID-19 (as of 31st March 2020).

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Table 1. Summary of reported paediatric cases on COVID-19 (as of 31st March 2020).

Authors	Country	No. of cases reported	Age range
Bi et al.[9]	China	20	-
Cai et al.[10]	China	10	3m to 11y
CDC[11]	USA	123	<19y
Chan et al. [12]	China	1	<1y
Chang et al.[13]	China	1	10y
Chen et al.[14]	China	9	<1y
Chen et al.[15]	China	4	<1y
Choe et al.[16]	South Korea	480	0-19y
Cui et al.[17]	China	1	<1y
D'Antiga[18]	Italy	3	-
Dong et al.[7]	China	731	7y (median)
Dong et al.[19]	China	1	<1y
Fan et al[20]	China	2	<1y
Henry et al.[21]	International	82	10y
Ji et al.[22]	China	2	>15y

Kam et al.[23]	Singapore	1	<1y
Li et al.[24]	China	5	10m to 6y
Liu et al.[25]	China	6	1-7y
Liu et al.[26]	China	4	-
Livingston and Bucher[27]	Italy	270	<18y
Lou et al.[28]	China	3	6m to 8y
Lu et al.[29]	China	171	-
Mizumoto et al.[30]	Japan	10	0-19y
Pan et al.[31]	China	1	3y
Qiu et al.[32]	China	36	0-16y
Tang et al.[33]	China	26	1 to 13y
Wang et al.[34]	China	1	<1y
Wang et al.[35]	China	1	<1y
Wang et al.[36]	China	34	7y (median)
Wei et al.[37]	China	9	<1y
Wu et al.[38]	China	965	<19y
Xia et al.[39]	China	20	-
Xing et al.[40]	China	3	5 and 6 y
Xu et al.[41]	China	2	10 to 11y
Yu et al.[42]	China	7	<1y
Zeng et al.[43]	China	3	<1y
Zhang et al.[44]	China	34	1m to 12y
Zhu et al.[45]	China	10	<1y

CDC - Center for Disease Control & Prevention; USA - United States of America; m - months; y-years